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SACRAMENTO VALLEY
WATER QUALITY COALITION

Water Quality Management Plan

prepared by

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SVWQC Management Plan

Table of Contents

Introduction.....	4
Overall Approach.....	4
1. Source Identification Strategies	5
2. Management Practice Implementation	5
3. Management Practice Implementation Schedule.....	6
4. Performance Goals and Criteria for Completion of Management Plan.....	7
5. Evaluation of Management Plan Effectiveness	10
6. Monitoring	10
7. Participants and Responsibilities for Implementation	10
8. Documentation and Reporting	13
9. Approaches for Specific Management Plan Categories.....	14
REGISTERED PESTICIDES	16
Review Data and Regulatory Basis for Exceedances	16
Source Identification.....	16
Management Practice Implementation	17
Implementation Schedule.....	18
Completion Criteria and Performance Goals.....	18
Evaluation of Management Plan Effectiveness	20
Monitoring	20
Participants Responsible for Implementation	20
Reporting Schedule.....	20
TOXICITY IN WATER AND SEDIMENT.....	21
Source Identification.....	21
Management Practice Implementation	22
Implementation Schedule.....	23
Completion Criteria and Performance Goals.....	23
Evaluation of Management Plan Effectiveness	24
Monitoring	24
Participants Responsible for Implementation	25
Reporting Schedule.....	25
PATHOGEN INDICATORS.....	26

SVWQC Management Plan

Review Data and Regulatory Basis for Exceedances	26
Source Identification	26
Management Practice Implementation	27
Implementation Schedule.....	28
Completion Criteria and Performance Goals	28
Evaluation of Management Plan Effectiveness	30
Monitoring	30
Participants Responsible for Implementation	30
Reporting Schedule	30
LEGACY ORGANOCHLORINE PESTICIDES.....	31
Review Data and Regulatory Basis for Exceedances	31
Source Identification	31
Management Practice Implementation	32
Implementation Schedule.....	32
Completion Criteria and Performance Goals	32
Evaluation of Management Plan Effectiveness	34
Monitoring	34
Participants Responsible for Implementation	34
Reporting Schedule	34
TRACE METALS.....	35
Review Data and Regulatory Basis for Exceedances	35
Source Identification	35
Management Practice Implementation	36
Implementation Schedule.....	36
Completion Criteria and Performance Goals	37
Evaluation of Management Plan Effectiveness	38
Monitoring	38
Participants Responsible for Implementation	38
Reporting Schedule	38
SALINITY	39
Review Data and Regulatory Basis for Exceedances	39
Source Identification	39
Management Practice Implementation	40

SVWQC Management Plan

Implementation Schedule.....	41
Completion Criteria and Performance Goals	41
Evaluation of Management Plan Effectiveness	41
Monitoring	42
Participants Responsible for Implementation	42
Reporting Schedule	42
DO and pH.....	43
Review Data and Regulatory Basis for Exceedances	43
Source Identification	43
Management Practice Implementation	44
Implementation Schedule.....	45
Completion Criteria and Performance Goals	45
Evaluation of Management Plan Effectiveness	46
Monitoring	46
Participants Responsible for Implementation	47
Reporting Schedule	47
Appendix A: List of Parameters Requiring Management Plan Development and Implementation	
Appendix B: Site-Specific Management Plan Implementation	
Appendix C: Implementation Responsibilities and Schedule	

List of Tables

Table 1. General Management Practice Implementation Schedule	6
Table 2. Management Plan Categories and Priorities	15
Table 3. Pesticide Management Plan Completion Criteria.....	19
Table 4. Toxicity Management Plan Completion Criteria.....	23
Table 5. Pathogen Management Plan Completion Criteria	29
Table 6. Legacy Organochlorine Pesticide Management Plan Completion Criteria	33
Table 7. Trace Metals Management Plan Completion Criteria	37
Table 8. DO and pH Management Plan Completion Criteria	46

Introduction

The primary purpose of this Management Plan is to document efforts that will be made by the Sacramento Valley Water Quality Coalition (Coalition) to address multiple exceedances of the same constituent at a given site within a three-year period. This Management Plan, as required by the Central Valley Regional Water Quality Control Board (Regional Water Board) under the Irrigated Lands Regulatory Program (ILRP), addresses exceedances through September 2007.

This Management Plan includes the following elements, as specified in the ILRP:

- Overall Approach
- Registered Pesticides
- Toxicity in Water and Sediment
- Pathogen Indicators
- Legacy Organochlorines Pesticides
- Trace Metals
- Salinity
- DO and pH
- List of Exceedances Requiring Management Plan Development and Implementation
- Site-Specific Management Plan Implementation

Overall Approach

The Coalition's Management Plan approach includes the following elements, consistent with guidance proposed in the Monitoring and Reporting Program (MRP) adopted by the Regional Water Board in January 2008 (*Order No. R5-2008-0005*).

1. Strategy for identification of potential sources of the observed exceedances (1. Source Identification Strategies)
2. Process to identify potential additional Management Practices to be implemented to address the exceedances (2. Management Practice Implementation)
3. Management Practices implementation schedule (3. Management Practice Implementation Schedule)
4. Management Plan completion criteria and performance goals (4. Performance Goals and Criteria for Completion of Management Plan)
5. Process and schedule for evaluating management plan effectiveness (5. Evaluation of Management Plan Effectiveness)
6. Monitoring strategy and schedule (6. Monitoring)

SVWQC Management Plan

7. Identification of the participants that will implement the Management Plan (7. Participants and Responsibilities for Implementation)
8. Schedule and process for reporting the results of Management Plan actions to Regional Water Board staff. (8. Documentation and Reporting)

1. SOURCE IDENTIFICATION STRATEGIES

Source identification strategies for the Management Plan will vary and will be specified for each pollutant category and drainage, and may include any of the following:

- Additional review of pesticide applications
- Evaluation of adequacy of analytical and sampling methods to identify sources
- Evaluation of Coalition and other monitoring data
- Identification of agricultural and non-agricultural sources (if information for non-agricultural sources is available)
- Evaluation of agricultural vs. non-agricultural source contributions
- A focused “Watershed Evaluation Report” documenting relevant site-specific information for irrigated parcels in the drainage (crops, pesticide use, irrigation practices, management practices in place, Coalition participants, etc.)
- Ground-level visual reconnaissance of the water body.
- Monitoring for relevant constituents of interest
- Source identification special studies

2. MANAGEMENT PRACTICE IMPLEMENTATION

Implementation of additional management practices is dependent on the outcome of the source identification evaluations described previously, and on the knowledge of “baseline” management practices that are already implemented. In addition to the specific source identification efforts identified for each Management Plan element, the process to identify additional management practices will consider the following elements:

1. Meetings with individual landowners and/or growers to discuss exceedances, possible sources, and management plan requirements and goals.
2. Information for management practices already in place will be developed through surveys of owners and/or growers. Survey forms will be developed based on the site and the exceedance. The Regional Water Board staff will be provided a copy upon request.
3. Additional outreach will be conducted dependent on the results of source identification efforts and will provide options for additional appropriate management practices.

The results of these outreach efforts will be documented and included in the required reports of the results of Management Plan Actions. Documentation of outreach efforts will include the participants, additional practices planned to be implemented, and the schedule for implementation.

3. MANAGEMENT PRACTICE IMPLEMENTATION SCHEDULE

The schedule for implementation of management practices will be repeated as overlapping two-year cycles, beginning when new management plan requirements are triggered. A tentative two-year schedule for development and implementation of additional practices is provided in **Table 1** and one cycle is illustrated for 2008-2010 in **Figure 1**.

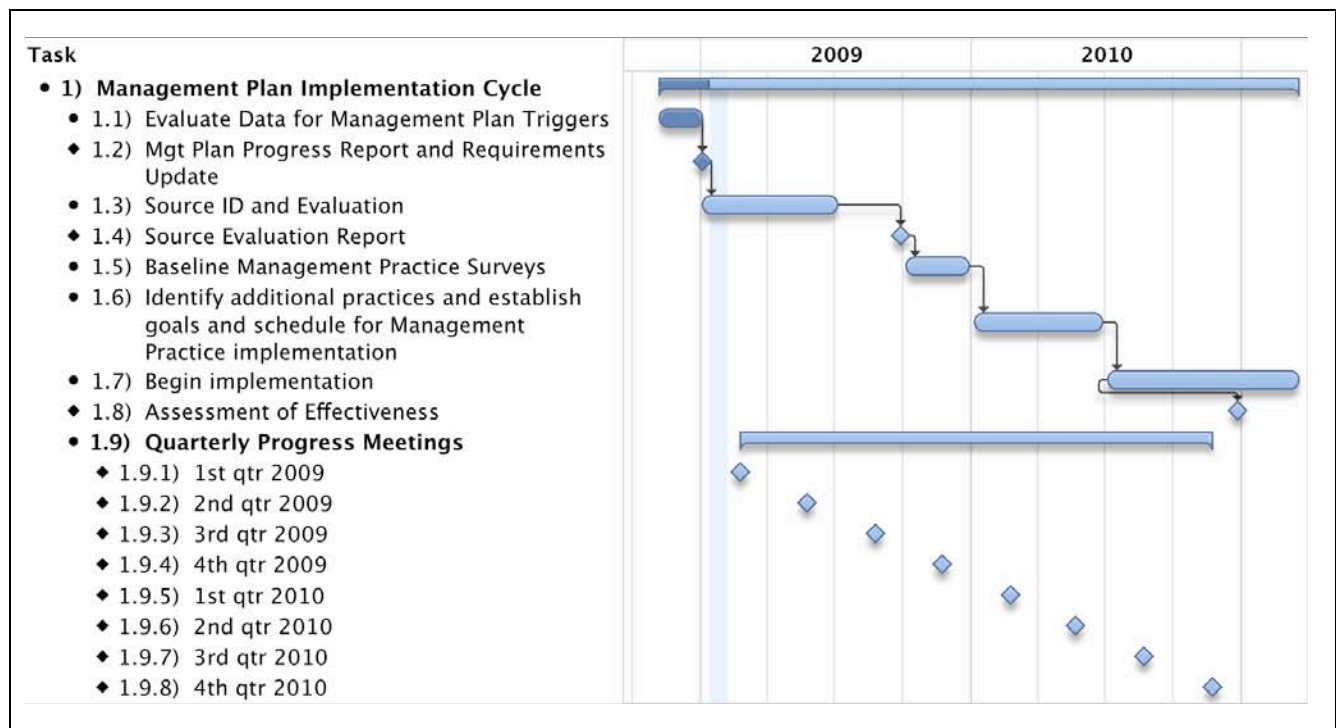
Table 1. General Management Practice Implementation Schedule

Implementation Element	Tentative Two-Year Schedule for High Priorities*
Evaluate data for Management Plan requirements (Data evaluated through September of each year)	November – December
Management Plan Progress Reports and Requirements List Update	December each year
Initial Source Identification and Evaluation	July of the year following trigger
Source Evaluation Report	September of the year following trigger
Surveys of Baseline Management Practice Implementation	December of the year following trigger
If source evaluation is conclusive, identify additional practices and establish goals and schedule for implementation	June of 2 nd year following trigger
Implement or design for Spring-Fall installation of additional Management Practices	Begin July of 2 nd year following trigger
Assessment of Management Plan effectiveness	Annually in Management Plan Progress Reports, (December of each year)

*Schedule may be extended for LOW and MEDIUM priority management categories (legacy pesticides, trace metals, DO, pH, pathogen indicators, and salinity) or water bodies.

The schedule for implementation of additional management practices will be included in the documentation of outreach efforts described above. The specific entities responsible for tracking implementation of management practices will also be identified. These entities are expected to vary by specific management plan element and subwatershed. The Coalition will provide assistance to these entities to allow consolidation and reporting of the tracking information to the Water Board in a consistent format. Implementation progress will be evaluated and documented in annual reports for the Management Plan.

Figure 1. Example Management Plan Implementation Schedule, 2008 – 2010



4. PERFORMANCE GOALS AND CRITERIA FOR COMPLETION OF MANAGEMENT PLAN

The successful completion of specific Management Plan elements will be determined by the Executive Officer of the Regional Water Board. Generally, there are four possible pathways for successful completion of a specific management plan element:

1. Agriculture is confirmed not to be a source of the exceedances, and the issue is referred to Regional Water Board staff for other appropriate actions;
2. Agriculture is confirmed as a potential source, the source is eliminated or controlled, and compliance with water quality objectives is demonstrated;
3. Agriculture is a potential source, but compliance with water quality objectives is not achievable by reasonable and economically feasible agricultural management practices; or...
4. No conclusion can be reached regarding the probable source(s) of exceedances, and reasonable efforts to identify the source(s) have been exhausted.

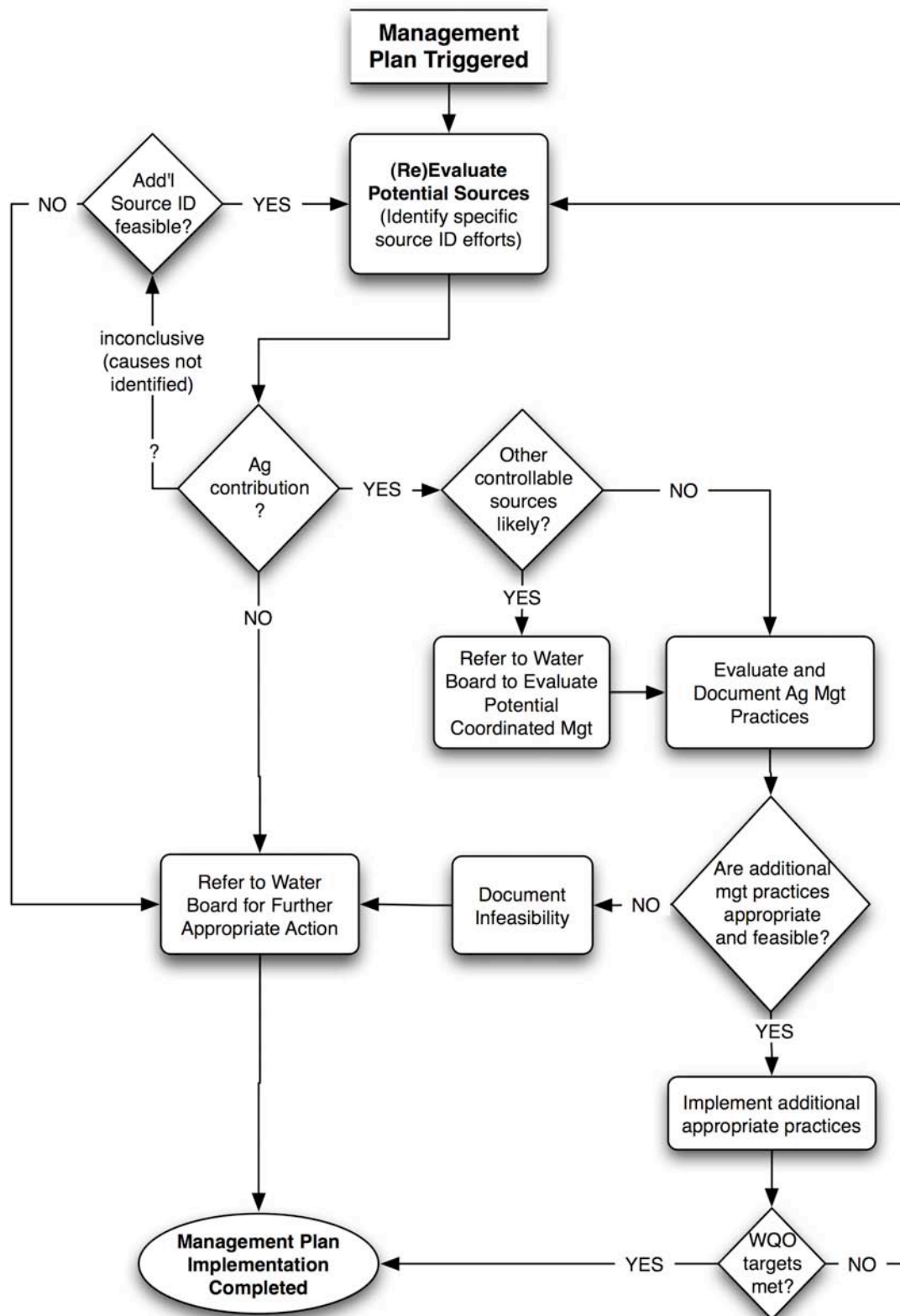
The criteria for completion of each of these pathways are illustrated in Figure 2. The specific criteria for each of these pathways will be clearly identified and documented for each Management Plan element.

Interim goals will also be set to track the progress of Management Plan implementation. These will include measures of outreach efforts (e.g., numbers of meetings with individual owners and growers, numbers of targeted workshops, numbers of mailings, advisory assistance to identify appropriate management practices), measures of management practice implementation, and measures of changes in water quality. The specific goals will be developed as appropriate for

SVWQC Management Plan

each element, and progress toward these goals will be tracked and reported in the annual Management Plan Progress Reports.

Figure 2. Management Plan Completion Pathways



5. EVALUATION OF MANAGEMENT PLAN EFFECTIVENESS

Ultimately, the effectiveness of management plans will be judged on improvements in water quality. However, a number of interim performance goals are necessary to evaluate progress toward these goals. Progress toward the implementation performance goals established for each subwatershed and management plan element will be evaluated and documented in annual Management Plan Progress Reports. Evaluation of effectiveness will be based on meeting the following kinds of performance goals:

- Completion of source identification and evaluation
- Completion and documentation of targeted outreach to Coalition members (and potential members, if appropriate)
- Return of surveys from 100% of Coalition members in the target drainages
- Documentation and reporting of baseline management practice inventory from surveys
- Implementation of numbers or percentages of specific additional management practices in target drainages (goals and schedule established in Management Plan Progress Report).
- Specified decreases in number or frequency of exceedances, detections, or average concentrations (goals and schedule established in Management Plan Progress Report).

6. MONITORING

The need for additional monitoring will be determined primarily based on the potential to provide useful information for source identification, in establishing causes of toxicity, and to evaluate management practice effectiveness. If additional monitoring is determined to be appropriate, the details of the monitoring required for each element will be documented, including the matrices and parameters to be analyzed, frequency of sampling, locations, and triggers for additional monitoring and follow-up. Integration of monitoring with regular Irrigated Lands Regulatory Program (ILRP) evaluation monitoring or coordination with other monitoring efforts will be considered and discussed, if appropriate. Management plan monitoring will be reviewed at least once per year, and revised as needed. The site-specific Management Plan monitoring will supersede any prior general monitoring design identified in the 2009 MRP Plan or in the Coalition-specific monitoring plan to be developed by the Regional Water Board for 2010.

7. PARTICIPANTS AND RESPONSIBILITIES FOR IMPLEMENTATION

The Sacramento Valley Water Quality Coalition (Coalition) was formed in 2002 to enhance and improve water quality in the Sacramento River Basin and to help growers and wetlands managers meet the requirements in the Irrigated Lands Regulatory Program (ILRP). The Coalition is comprised of farmers, wetlands managers, and affiliated state and local agricultural organizations, as well as local governments throughout the Sacramento River watershed, which is a twenty-one county region that spans from the Sacramento/San Joaquin Bay-Delta almost to the California-Oregon border.

On October 6, 2003, the Coalition, under Northern California Water Association (NCWA), submitted a Notice of Intent (NOI) and General Report on behalf of Coalition members to meet

SVWQC Management Plan

the requirements of the ILRP through a watershed-based water quality management program. On February 10, 2004, the Coalition received a Notice of Applicability (NOA) from the Regional Water Board Executive Officer approving the adequacy of the NOI and providing dischargers within the Coalition area' initial coverage under the ILRP.

Nested within the Sacramento Valley Water Quality Coalition (Coalition) are a series of "subwatershed" groups coordinated by the Coalition. Each subwatershed has a lead ("Subwatershed Coordinator") that can assist the Coalition and its members to successfully implement the ILRP in the Sacramento Valley: Northeastern California Water Association, Shasta-Tehama Water Education Coalition, Colusa Glenn Subwatershed Program, Butte-Yuba-Sutter Water Quality Coalition, Dixon/Solano RCD Water Quality Coalition, Sacramento-Amador Water Quality Alliance, Upper Feather Subwatershed Group, Placer/Nevada/South Sutter/North Sacramento Subwatershed Group, Napa County Putah Creek Watershed Group, Lake County Agricultural Watershed Group, the El Dorado County Agricultural Water Quality Management Corporation and the Yolo County Farm Bureau Education Corporation Subwatershed Program (collectively, the "Subwatershed Groups").

NCWA provides program management services on behalf of Coalition members to implement the Coalition's Regional Plan for Action submitted to the Regional Water Board on June 30, 2003, the Monitoring and Reporting Program Plan (MRPP) submitted by the Coalition on August 25, 2008, and the draft Management Plan submitted on September 30, 2008. As the program evolves NCWA will continue to provide program management and support to implement new plans and any plan amendments.

NCWA coordinates with contractors, including but not limited to Larry Walker Associates (LWA), regarding MRPP implementation. Under contract, LWA conducts water quality sampling and analyses at the sites consistent with the Coalition's MRPP, develops management plans, manages and implements the monitoring program, manages data, assists the Coalition with communication of water quality results to the Regional Water Board and growers, and draft monitoring reports.

NCWA also communicates with the Regional Water Board and the State Water Resources Control Board on behalf of Coalition members regarding program implementation, and manages data and Geographic Information System development for communications with growers and the Regional Water Board. NCWA coordinates any necessary legal action on behalf of the Coalition regarding the ILRP, and contracts with appropriate legal representation as necessary.

Each Subwatershed Group is responsible for developing the appropriate financing mechanism to generate revenue sufficient to cover the expenses described above as well as collecting fees, based on irrigated acre in the subwatershed, to pay the State to administer the ILRP. Each Subwatershed Group bears its own costs for local management and coordination with the Coalition. Each Subwatershed Groups maintains a working group comprised of representatives capable of reviewing communication reports drafted by LWA, and as appropriate, developing outreach strategies with growers to address water quality results. Each Subwatershed Group reviews drafts of the Semi Annual and/or Annual Reports prepared by LWA and provides timely feedback. Each Subwatershed Group continues to maintain a membership list of those agricultural irrigators and wetlands managers choosing to participate and seek "coverage" under the ILRP and provide the list annually to NCWA.

SVWQC Management Plan

For Coalition members to remain in good standing they must comply with the requirements of the ILRP. Coalition members must submit dues on time to their Subwatershed Group with an update on irrigated acres. Each member must be responsive to Coalition and Subwatershed Group requests including, but not limited to, completing and returning membership surveys, attending grower meetings (some are required while others are optional), and implementing best management practices as needed.

Accountability

The Coalition supports a broad cross-section of interests throughout the Sacramento River Basin. Its members have a proven record of implementing programs for social, economic and environmental benefits. The Coalition is committed to a program focused on enhancing and improving water quality in the Sacramento River Basin while sustaining the economic viability of agriculture and the associated values of managed wetlands.

To ensure accountability, the Coalition is committed to providing written updates and status reports on implementation of its various programs to the Regional Water Board. Upon request, the Coalition will also provide oral presentations. The updates and reports are designed to identify progress made within the Sacramento River Basin and to provide the Regional Water Board an opportunity to recommend additional efforts that might be beneficial.

The Coalition will assist local subwatershed groups in responding to problems identified by the monitoring program. With this capability in place, once a problem is identified, the Coalition, along with its subwatershed groups, partners and members, will make every effort to isolate and address the problem through improved management practices and/or other appropriate actions.

If management practices are ineffective or not adopted within a subwatershed, there are three mechanisms to ensure members are accountable to the Coalition and to the Regional Water Board:

- 1) To protect water quality and to address non-point source runoff, the State Water Board and Regional Water Boards utilize a framework with increasing levels of regulatory action based on watershed activities. This framework provides the State Water Board and Regional Water Boards with a tool for continual oversight within the watershed and the ability to increase the regulatory requirements if actions taken within the watershed do not effectively address a problem. Additionally, priority actions will focus on impaired water bodies governed by the Regional Water Board's TMDL process. These steps provide the State Water Board and Regional Water Boards complete control and ensure accountability.
- 2) If a subwatershed group encounters a discharger failing to cooperate with the subwatershed program, the subwatershed group will identify the situation and facilitate an informal conversation with the member about the situation. If this effort is unsuccessful and a violation of law or the Basin Plan is believed to be ongoing, the subwatershed group will work with the proper regulatory authorities to address the issue. If Coalition representatives identify concerns related to pesticide use they will report it to the County Agricultural Department and to Regional Water Board staff to determine which agency should take the lead in addressing the issue. For other constituents, the situation will be reported to the Regional Water Board staff. These steps provide accountability and ensure compliance with the law.

SVWQC Management Plan

- 3) Although subwatershed groups have no legal control over the management actions taken by landowners, the subwatershed groups can determine who is deemed a cooperating and participating member. Consequently, if the Coalition or subwatershed group recognizes that a member is not sufficiently participating in or cooperating with the subwatershed program, it will dismiss them from the subwatershed group. The Coalition's annual membership submittal to the Regional Water Board will not include non-participating growers on the membership list. However, to distinguish between growers who were dropped for non-participation (versus other reasons), the Coalition will provide a second worksheet of dropped members with an explanation of the change in membership status. This provides direct accountability to participation in the subwatershed group and compels involvement.

Education and Outreach

The Coalition's education and outreach efforts will ensure that consistent plans and accurate messages regarding water quality issues will effectively reach dischargers in the region. The target audiences include, but are not limited to landowners, wetlands managers and farmers. The Coalition will act as a facilitator and central hub for the transfer of information among the Sacramento Valley subwatersheds and ultimately to the landowners, farmers and wetlands managers. Furthermore, the Coalition will facilitate the identification and distribution of relevant information from activities and projects developed in other areas of the Central Valley.

The outreach message has evolved over time, initiating with general water quality issues and management practice reviews, advancing to the communication of specific results by watershed monitoring programs and offering information on various management measures that could be adopted by farmers to improve water quality. The collaboration offered through the Coalition will ensure that useful and scientifically accurate information about management options that are appropriate for the crops and geographic conditions in the region is available in a timely fashion to farmers. The outreach message will continue to evolve, building upon both historic and new information, relying on a long-term collaborative effort among the people who live and work within the watershed.

8. DOCUMENTATION AND REPORTING

Reporting for the Management Plan will provide sufficient and timely information regarding achievement of the performance goals. Reports will document source identification evaluations, evaluations needed to determine the effectiveness of the management practice implementation, and whether additional or different management practices need to be implemented. At a minimum, these evaluations will be conducted and reported annually, in coordination with the Coalition's Annual Monitoring Report. Data reports will be submitted on the same quarterly schedule and in the same formats as required by the MRP for regular Coalition monitoring.

The first Management Plan Progress Report will be submitted in December 2009. This initial Progress Report will include the results of monitoring for the previous year, the results of initial source identification evaluations, documentation of outreach efforts, a summary of completed baseline management practice inventories in priority drainages, and proposed goals for additional management practice implementation. The Progress Reports will also include an evaluation of progress toward completion of specific Management Plan elements, updates to the list of required Management Plan elements, and recommendations for continuation or modification of

SVWQC Management Plan

the Management Plan. In subsequent years, Progress Reports will also assess progress toward management practice implementation goals set in previous years.

Interim reporting schedules for source identification efforts will be based on the specific evaluations required. Management Plan Progress Reports will include the results of pesticide application reviews, evaluations of analytical methods, source evaluation, documentation of initial outreach meetings, documentation of any ground level reconnaissance conducted, and recommendations for the Management Plan monitoring.

9. APPROACHES FOR SPECIFIC MANAGEMENT PLAN CATEGORIES

Although collaborating on ideas and approach, each subwatershed will be working independently on specific elements of the Management Plan. Within each subwatershed, site-specific management plans for registered pesticides and toxicity will receive the highest priority for implementation, and legacy pesticides, and trace metals will receive a medium priority for implementation. Salinity (including conductivity and TDS), DO, pathogens, and pH will receive a LOW priority because these parameters have greater number of non-agricultural potential sources and causes, and consequently an expected longer time frame to identify appropriate coordinated solutions. Within subwatersheds, sites with multiple management plan requirements will also generally receive a higher priority for implementation of management plans. Priorities for sites and parameters will also be influenced by the magnitude and frequency of exceedances, and the ability of agricultural management practices to affect changes in water quality. Generally, the priority for sites or parameters will be reflected as an accelerated schedule and level of effort for higher priorities, and an extended schedule and lesser immediate commitment of resources for lower priorities. Levels of effort and schedules are detailed in the individual plans. The priorities for management plan categories were based on a subjective assessment of the potential for affecting beneficial uses, the probability of significant agricultural sources or contributions, the probability of other non-agricultural sources, and the requirements and potential for successful management (Table 2). Additional details are provided in the following sections for specific approaches to management plan categories.

SVWQC Management Plan

Table 2. Management Plan Categories and Priorities

Management Plan Category	Priority	Rationale for Priority
Registered pesticides	HIGH	High potential for affecting aquatic life beneficial uses; High probability of direct agricultural sources in many cases; High probability of successful management of agricultural sources with modified practices and other controls;
Toxicity in water and sediment	HIGH	High potential for affecting aquatic life beneficial uses; Moderate probability of direct agricultural sources with potential contributions from other anthropogenic and natural background sources; High probability of successful management of agricultural sources with modified practices <i>if specific sources of toxicity are identified</i> ;
Legacy Organochlorine Pesticides	MEDIUM	Low potential for affecting aquatic life beneficial uses, medium probability of affecting other uses; High probability of historical agricultural sources, no current sources; Long-term management of multiple sources likely required even with successful management of agricultural sources;
Trace Metals	MEDIUM	Moderate potential for affecting aquatic life and other beneficial uses (depends on trace metal); Moderate probability of historical or current agricultural sources; High probability of natural background contributions; Long-term management of multiple sources likely required even with successful management of agricultural sources
Salinity (including Conductivity and TDS)	LOW	Low potential for affecting aquatic life, medium probability of affecting other uses, including agriculture; No direct agricultural sources, but high probability of agricultural contributions through consumptive uses, and high probability of contributions from other anthropogenic and uncontrollable background sources; Long-term integrated management of multiple sources required for solution;
Pathogen indicators	LOW	Low potential for affecting aquatic life, moderate probability of affecting other uses; Moderate probability of significant agricultural sources, with high probability of contributions from other anthropogenic and uncontrollable natural sources; Long-term management of multiple sources likely required even with successful management of agricultural sources;
DO and pH	LOW	Moderate potential for affecting aquatic life, low probability of affecting other uses; Low probability of significant direct agricultural sources, with high probability of natural causes; Long-term management of multiple sources likely required even with successful management of agricultural sources;

REGISTERED PESTICIDES

This element of the Management Plan addresses exceedances of numeric water quality objectives or numeric interpretations of narrative objectives for pesticides legally registered for use for agricultural purposes. Sites observed to have more than one exceedance in three years of applicable numeric or narrative water quality objectives for registered pesticides are listed in **Appendix A**. Implementation of this element of the management plan will be conducted on a drainage-specific basis for the drainages determined to require management of pesticide exceedances.

REVIEW DATA AND REGULATORY BASIS FOR EXCEEDANCES

The need for developing management plans is determined by exceedances of “Water Quality trigger limits” established by the Regional Water Board ILRP. These trigger limits include adopted numeric Basin Plan water quality objectives, California Toxics Rule criteria, and unadopted numeric interpretations of Basin Plan narrative objectives. The first step in the implementation of this element of the management plan is a review of the Coalition’s monitoring data and the basis establishing the need for the management plan. The basis for these trigger limits will be reviewed and evaluated for regulatory and scientific validity. Generally, adopted numeric objectives and criteria will be determined valid without any substantial additional review. Trigger limits based on unadopted numeric interpretations will receive additional evaluation. Any substantial questions regarding validity or basis for the triggers used to determine exceedances will be summarized and provided to the Regional Water Board staff and the ILRP Technical Issues Committee for additional consideration, evaluation, and confirmation. Based on the results of these considerations, the exceedances and need for a pesticide-specific management plan may be reevaluated. However, development and implementation of management plans required by exceedances of these trigger limits will proceed according to the normal schedule while any additional considerations are completed.

Sites observed to have more than one exceedance within a three year period of numeric Basin Plan water quality objectives or numeric interpretations of Basin Plan narrative objectives for pesticides registered for agricultural uses are listed in **Appendix A**. Exceedances based on trigger limits requiring additional evaluation are identified in the site-specific management plans in **Appendix B**.

SOURCE IDENTIFICATION

The following source identification efforts will be conducted on a drainage-specific basis to identify sources of pesticides and to evaluate potential agricultural and non-agricultural contributions to pesticide exceedances:

- ❑ Review of pesticide application data: Pesticide application data from California Department of Pesticide Regulations (CDPR) will be compiled and reviewed to determine whether the registered pesticides are used or likely to be used by irrigated agriculture in the affected drainages. Data will be compiled for applications of the specific pesticides in the affected drainages. Application data will be evaluated for use patterns and timing, and will consider characteristics that affect fate and transport (e.g., solubility and half-life). For instance, a longer period of application data would be

SVWQC Management Plan

considered when evaluating insoluble, sediment-bound pesticides with longer half-lives. The results of these evaluations will be confirmed by consultation with County Agricultural Departments. If necessary, use of specific pesticides of concern may also be confirmed through the surveys designed to collect Management Practice implementation data from growers (described below in Management Practice Implementation).

- ❑ Identification of potential agricultural and non-agricultural sources: Agricultural and non-agricultural sources of the pesticides will be identified and relative contributions will be evaluated based on pesticide use and application data, as well as relevant information for non-reported uses such as consumer retail sales and use. The relative importance of contributions will consider the percentage of land use comprised by each potential source, and their proximity and connection to surface waters of the drainage. The primary purpose of this evaluation is to determine whether irrigated agriculture is a likely source of the pesticides of concern. The secondary purpose is to identify other potential substantial non-agricultural sources.
- ❑ Source Evaluation Report: A focused Source Evaluation Report will be prepared documenting the following drainage-specific information: reported use of the specific pesticides of concern by crop or commodity; crops by percent of the total irrigated acreage and total acreage; application and irrigation practices; an initial list of the types of relevant management practices thought to be currently in use; and percent of agricultural acreage represented by Coalition participants in the drainage. Potential sources will be prioritized by reported use of specific pesticides of concern, drainage distance and connectivity to water bodies, percent of irrigated acreage and total acreage, pesticide application and irrigation practices, and relevant management practices. The purpose of this evaluation is to prioritize potential agricultural sources for outreach and management practice implementation. This report will be completed by September of the year following the trigger of the specific management plan requirement (see **Table 1** and **Figure 1**). Schedules and goals for additional management plan elements (e.g., management practice implementation) will be developed and modified based on the results of the source evaluation.

MANAGEMENT PRACTICE IMPLEMENTATION

As discussed in the “Overall Approach,” implementation of specific additional appropriate management practices will depend on the outcome of the source identification evaluations described above and on “baseline” practices already in place. If irrigated agriculture is a potential source of the pesticide(s) of interest, the process to identify appropriate additional management practices will include the following elements:

- ❑ If potential irrigated agricultural sources of pesticides are confirmed, detailed information for management practices already in place in the targeted drainages will be developed through surveys of Coalition members. This information will be used to determine whether implementation of additional management practices is appropriate and feasible, and to establish goals for additional management practice implementation. Identification of options for appropriate management practices may be coordinated with Coalition for Urban/Rural Environmental Stewardship (CURES), University of California Cooperative Extension (UCCE), County Agriculture Departments, Natural Resources Conservation Service (NRCS), Resource Conservation Districts (RCDs), farm input suppliers, and pest

SVWQC Management Plan

control advisors, depending on the available resources. The specific coordinating entities are expected to vary in the different Coalition subwatersheds. Follow-up surveys will be conducted annually to measure and track progress toward the goals established for BMP implementation. The survey to inventory baseline management practices will be completed by December of the year following trigger of the specific management plan.

- ☐ Develop a list of prioritized BMPs specific to pesticides of concern, and establish goals and schedule for additional implementation (reported in December, in Management Plan Progress Reports)
- ☐ Meetings with individual landowners and/or growers to discuss exceedances, sources of pesticides, and management plan requirements and goals.
- ☐ Additional targeted outreach will be conducted dependent on the results of source identification efforts and will provide options for additional appropriate management practices. Outreach will be prioritized and directed to users and potential users of the pesticides of concern.
- ☐ Implementation actions will be coordinated with the Department of Pesticide Regulation and County Agriculture Departments when possible and appropriate. The need to coordinate with these entities will be determined on a case-by-case basis, based on the requirements or effectiveness of their authority to address specific pesticide related issues. In most cases, it is expected that this coordination would consist of keeping the Department of Pesticide Regulation informed of the issues, while working with the County Agriculture Departments to resolve issues.

The results of outreach efforts will be documented and included in the Management Plan Progress Reports. These reports will also document any additional practices planned to be implemented, the goals and schedule for implementation, and measures of progress toward these goals. If it is determined that no additional appropriate management practices to control pesticide exceedances are feasible, this will also be documented.

IMPLEMENTATION SCHEDULE

The schedule for development and implementation of additional management practices will be conducted as described in the overall Management Plan approach (**Figure 1**). The schedule will include quarterly progress meetings with the Regional Water Board ILRP staff. The schedule for site-specific and parameter-specific management plan elements is documented in **Appendix B**. The results of source identification efforts will be used to prioritize drainages or commodities by greatest use potential for the specific pesticides of concern and lowest rates of BMP implementation. These priorities will be reflected in the schedule and scope of management plan implementation.

COMPLETION CRITERIA AND PERFORMANCE GOALS

The successful completion of the Management Plan will be determined by the Executive Officer of the Regional Water Board. The possible pathways for successful completion of this element of the management plan are described in the Overall Approach section.

The criteria for completion of each these pathways are summarized in Table 3 and the pathways are also illustrated in **Figure 2**. Because the relative contributions to specific pesticide

SVWQC Management Plan

exceedances will generally not be able to be quantified, these criteria are generally qualitative, with the exception of compliance with water quality objectives. Consequently, determination that a specific criterion has been met will be based on a “weight of evidence” approach in consultation with Regional Water Board staff and approved by the Executive Officer of the Regional Board. Determination of compliance with water quality objectives for pesticides will be determined to occur when no more than one exceedance of the appropriate trigger limit has been observed in three years of the specified management plan monitoring.

Progress toward the implementation performance goals established for each subwatershed will be evaluated and documented in annual Management Plan Progress Reports. Specific performance goals will include the following:

- Completion of source identification and evaluation
- Completion and documentation of targeted outreach to Coalition members (and potential members, if appropriate)
- Return of management practice surveys from 100% of Coalition members in the target drainage (completed by December of year following trigger of management plan requirement).
- Documentation and reporting of baseline management practice inventory from surveys
Implementation of numbers or percentages of specific additional management practices in target drainages (goals and schedule established in Management Plan Progress Report).
- Specified decreases in number or frequency of exceedances, detections, or average concentrations (goals and schedule established in Management Plan Progress Report).

Table 3. Pesticide Management Plan Completion Criteria

Management Plan Pathway	Criteria for Successful Completion	Endpoint
1. Agriculture eliminated as source of exceedances	<ul style="list-style-type: none">• Pesticide confirmed not to have significant irrigated agricultural sources;	Issue is referred to Regional Water Board staff for appropriate actions.
2. WQOs achieved by control of probable agricultural source(s) of exceedances	<ul style="list-style-type: none">• Irrigated agricultural sources likely; <u>AND</u>• Appropriate additional agricultural management practices have been identified, implemented, and documented; <u>AND</u>• Demonstrated achievement of water quality objectives	Periodically reevaluate compliance per MRP monitoring schedule.
3. WQOs not achievable by control of probable agricultural source(s) of exceedances	<ul style="list-style-type: none">• Irrigated agricultural sources likely; <u>AND</u>• WQOs not achieved or expected to be achieved; <u>AND</u>• No additional appropriate management practices are possible or economically feasible;	Infeasibility is documented and issue is referred to Regional Water Board staff for appropriate actions.
4. Probable sources not identified	<ul style="list-style-type: none">• Sources of specific pesticides not identified; <u>AND</u>• All reasonable efforts at source ID exhausted	Documented and referred to Regional Water Board staff for

EVALUATION OF MANAGEMENT PLAN EFFECTIVENESS

Ultimately, the effectiveness of management plans will be judged on improvements in water quality and meeting water quality objectives. In the interim, the effectiveness of the management plan will be evaluated based on meeting the interim performance goals described above. Progress toward the implementation performance goals established for each subwatershed and management plan element will be evaluated and documented in annual Management Plan Progress Reports.

MONITORING

Monitoring proposed to be performed as part of this element of the management plan is summarized in **Appendix B**. Some sites will continue to be monitored routinely as part of the Coalition's ongoing monitoring effort. Other sites will be monitored during high use periods for the specific pesticide(s) of concern in that drainage. Sites will continue to be monitored for specific pesticides as needed to evaluate success of implemented management practices. Continued monitoring of these sites beginning in 2009 will be integrated with the monitoring strategy being developed by the Coalition in response to renewed ILRP MRP. Specific seasons and timing of the continued monitoring will be based on pesticide use patterns determined in the source identification evaluations and monitoring results. Any changes to the approved monitoring schedule must be approved by Regional Water Board staff prior to implementation.

PARTICIPANTS RESPONSIBLE FOR IMPLEMENTATION

The participants responsible for implementing specific elements of the Management Plan are provided in **Appendix B**.

REPORTING SCHEDULE

The results of initial source identification efforts will be reported in a technical memorandum by September of the year following trigger of management plan requirements, with the first report due in September 2009. The reports will include the results of data reviews, any trigger limit evaluations, pesticide application reviews, source identification and evaluation, documentation of initial outreach meetings, and recommendations for the Management Plan monitoring. All other reporting for this element will be scheduled as proposed in the Overall Management Plan Approach.

TOXICITY IN WATER AND SEDIMENT

This element of the Management Plan addresses exceedances of narrative objectives for toxicity in the Basin Plan. Sites observed to have more than one exceedance in three years of the narrative prohibition against toxicity (significant reductions of invertebrate or fish survival or algae growth compared to the laboratory control) are listed in **Appendix A**. Implementation of this element of the management plan will be conducted on a drainage-specific basis for the drainages determined to require management of toxicity exceedances.

SOURCE IDENTIFICATION

The following source identification efforts will be conducted on a drainage-specific basis to identify causes and sources of toxicity, and to evaluate potential agricultural and non-agricultural contributions to toxicity. The primary distinction between source identification efforts for aquatic and sediment toxicity is a focus on soluble or more hydrophobic sediment-associated pesticides or other contaminants.

- ❑ Evaluation of Coalition Monitoring Data: Coalition data for toxicity, TIEs, chemistry, and follow-up analyses will be reviewed to identify potential causes and sources of the observed cases of toxicity. Data for all potentially toxic ILRP analytes will be evaluated to identify or eliminate potential causes of toxicity, including pesticides, trace metals, and ammonia. This evaluation will also consider potentially additive or synergistic effects of detected analytes, based on interactions documented in literature and on similar modes of action. Coalition analytical methods will also be evaluated to confirm that they are adequate to detect potentially toxic constituents at concentrations of concern and to identify sources. If they are determined not to be adequate for this purpose, alternative analytical methods will be evaluated.
- ❑ Additional review of pesticide applications: If toxicity cannot be reasonably attributed to constituents monitored for the ILRP, additional review of pesticide application data will be conducted to evaluate whether other unmonitored pesticides have potential to contribute to toxicity. Data will be compiled for pesticide applications in the specific parcels in the affected drainages. The period of application data reviewed will depend on the type of toxicity (aquatic or sediment) and likely causes of toxicity, but will include at least the month prior to and including the sample dates of each sample determined to be significantly toxic. Applied pesticides will be evaluated to identify or eliminate potential causes of toxicity based on the use pattern and timing, toxicity characteristics, and physical and chemical characteristics. TIE procedures used previously will be reviewed to determine whether these procedures were appropriate for the characteristics of specific unmonitored pesticides of concern, and recommendations will be made for modifications, if appropriate. Pesticides determined likely to cause or contribute to the observed toxicity may be added to the list of monitored constituents, if appropriate methods are available.
- ❑ Identification of agricultural and non-agricultural sources: Agricultural and non-agricultural potential sources or causes of toxicity determined above will be identified and their relative contributions will be evaluated. Non-agricultural sources may include pesticide applications for mosquito abatement or weed control on rights-of-way, urban or rural residential runoff, treated wastewater, etcetera).

- ❑ **Source Evaluation Report:** A focused Source Evaluation Report will be prepared to document the following drainage-specific information for irrigated parcels in the affected drainages: crops by percent of the total irrigated acreage and total acres, pesticide use by crop or commodity, irrigation practices, management practices currently in place, and Coalition participants. Potential sources will be prioritized by reported use of identified causes of toxicity, drainage distance and connectivity to water bodies, percent of total irrigated acreage and total acres, and use of relevant management practices. This report will be completed by September of the year following the trigger of the specific management plan requirement (see **Table 1** and **Figure 1**), with the first report due in 2009. Schedules and goals for additional management plan elements (e.g., management practice implementation) will be developed and modified based on the results of the source evaluation.

MANAGEMENT PRACTICE IMPLEMENTATION

As discussed in the “Overall Approach”, implementation of specific additional appropriate management practices will depend on the outcome of the source identification evaluations described above and on “baseline” practices already in place. In addition to the source identification efforts described above, the process to identify appropriate additional management practices will include the following elements:

- ❑ If irrigated agricultural sources of pesticides are not initially ruled out, detailed information for relevant management practices already in place in the targeted drainages will be developed through surveys of Coalition members. Surveys related to sediment toxicity will include erosion and sediment management practices. This information will be used to determine whether implementation of additional management practices is appropriate and feasible, and to establish goals for additional management practice implementation. Identification of options for appropriate management practices may be coordinated with CURES, UCCE, County Agriculture Departments, NRCS, RCDs, farm input suppliers, and pest control advisors, depending on the available resources. The specific coordinating entities are expected to be different for the different Coalition subwatersheds. Follow-up surveys will be conducted annually to measure and track progress toward the goals established for BMP implementation. The survey to inventory baseline management practices will be completed by June and reported in September of the year following trigger of the specific management plan.
- ❑ If the cause of toxicity is determined to be registered pesticides or other specific agricultural sources, meetings will be held with individual landowners and/or growers to discuss exceedances, possible sources, and management plan requirements and goals.
- ❑ Additional outreach will be conducted dependent on the results of source identification efforts and will provide options identified above for additional appropriate management practices.

The results of outreach efforts will be documented and included in the Management Plan Progress Reports. These reports will also document any additional practices to be implemented, the goals and schedule for implementation, and measures of progress toward these goals. If it is determined that no additional appropriate management practices to control toxicity are feasible, this will also be documented.

IMPLEMENTATION SCHEDULE

The schedule for development and implementation of additional management practices will be conducted as described in the overall Management Plan approach (Figure 1). The schedule will include quarterly progress meetings with the Regional Water Board ILRP staff. The schedule for site-specific and parameter-specific management plan elements is documented in **Appendix B**. The results of source identification efforts will be used to prioritize drainages or commodities by greatest use potential for the specific identified causes of toxicity and the lowest rates of BMP implementation. These priorities will be reflected in the schedule and scope of management plan implementation.

COMPLETION CRITERIA AND PERFORMANCE GOALS

The successful completion of the Management Plan will be determined by the Executive Officer of the Regional Water Board. The possible pathways for successful completion of this element of the management plan are described in the Overall Approach section.

The criteria for completion of each of these pathways are summarized in Table 4 and the pathways are illustrated in **Figure 2**. Because the specific causes of toxicity exceedances may not be known and may not be determined in spite of our best efforts, these criteria are generally qualitative, with the exception of compliance with water quality objectives. Consequently, determination that a specific criterion has been met will be based on a “weight of evidence” approach in consultation with Regional Water Board staff and approved by the Executive Officer of the Regional Board. Determination of compliance with water quality objectives for toxicity will be determined to occur when no more than one exceedance has been observed in three years of the specified management plan monitoring.

Progress toward the implementation performance goals established for each subwatershed will be evaluated and documented in annual Management Plan Progress Reports. Specific performance goals will include the following:

- Completion of source identification and evaluation
- Completion and documentation of targeted outreach to Coalition members (and potential members, if appropriate)
- If surveys are conducted, return of management practice surveys from 100% of Coalition members in the target drainages.
- Documentation and reporting of baseline management practice inventory from surveys
- Implementation of numbers or percentages of specific additional management practices in target drainages (goals and schedule established in Management Plan Progress Report).
- Specified decreases in frequency of exceedances, detections, or average concentrations (goals and schedule established in Management Plan Progress Report).

Table 4. Toxicity Management Plan Completion Criteria

Management Plan Pathway	Criteria for Successful Completion	Endpoint
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SVWQC Management Plan

1. Agriculture eliminated as probable source of exceedances	<ul style="list-style-type: none"> • Probable specific toxicant(s) are identified; <u>AND</u> • Probable specific toxicant(s) confirmed not to have significant agricultural sources; <u>OR...</u> • Probable specific toxicant(s) not identified; <u>AND</u> • The weight of evidence of TIEs, monitoring data, WER, and pesticide use evaluations all support a conclusion that agriculture is not a significant source; 	Issue is referred to Regional Water Board staff for appropriate actions.
2. WQOs achieved by control of probable agricultural source(s) of exceedances	<ul style="list-style-type: none"> • Probable specific toxicant(s) identified; <u>AND</u> • Potentially significant agricultural sources likely; <u>AND</u> • Appropriate additional agricultural management practices have been identified, implemented, and documented; <u>AND</u> • Demonstrated achievement of water quality objectives 	Periodically reevaluate compliance per MRP monitoring schedule.
3. WQOs not achievable by control of probable agricultural source(s) of exceedances	<ul style="list-style-type: none"> • Specific toxicant(s) identified; <u>AND</u> • Potentially significant agricultural sources are likely; <u>AND</u> • WQOs not achieved or expected to be achieved; <u>AND</u> • No additional appropriate management practices are possible or economically feasible; 	Infeasibility is documented and issue is referred to Regional Water Board staff for appropriate actions.
4. Probable sources not identified	<ul style="list-style-type: none"> • Probable specific toxicant(s) not identified; <u>AND</u> • All reasonable efforts at source ID exhausted 	Documented and referred to Regional Water Board staff for appropriate actions.

EVALUATION OF MANAGEMENT PLAN EFFECTIVENESS

Ultimately, the effectiveness of management plans will be judged on improvements in water quality and meeting water quality objectives. In the interim, the effectiveness of the management plan will be evaluated based on meeting the interim performance goals described above. Progress toward the implementation performance goals established for each subwatershed and management plan element will be evaluated and documented in annual Management Plan Progress Reports.

MONITORING

Monitoring to be performed as part of this element of the management plan is summarized in **Appendix B**. Most sites will continue to be monitored routinely as part of the Coalition's ongoing monitoring effort. TIEs and serial dilution testing required by the MRP will continue to be conducted at these sites. Additional sampling and analysis of water or sediment may be added if recommended by the initial source identification efforts. Subsequent to completion of Coalition monitoring, sites will continue to be monitored for a limited subset of parameters as needed to evaluate success of implemented management practices. These continued analyses will include appropriate toxicity testing, and pesticides or other parameters as recommended by the results of the source identification element of the Management Plan. The specific parameters to

SVWQC Management Plan

be monitored after 2009 will be reevaluated based on the results of previous monitoring in the affected drainages. The frequency for continued monitoring of these sites beginning in 2009 will be four (4) events per year for aquatic toxicity, and two (2) events per year for sediment toxicity. The frequency of aquatic toxicity monitoring is lower than the frequency during the Assessment phase for most sites, but allows for continued evaluation of the causes and sources of toxicity during source identification efforts. Toxicity monitoring will be integrated with the monitoring strategy being developed by the Coalition in response to renewed ILRP MRP. Specific seasons and timing of the monitoring will be determined based on the results of the source identification evaluations and monitoring results. Any changes to the approved monitoring schedule must be approved by Regional Water Board staff prior to implementation.

PARTICIPANTS RESPONSIBLE FOR IMPLEMENTATION

The participants responsible for implementing specific elements of the Management Plan are provided in **Appendix B**.

REPORTING SCHEDULE

The results of initial source identification efforts and the inventory of baseline management practices will be reported in a technical memorandum by September of the year following trigger of management plan requirements, with the first report due in September 2009. The reports will include the results of data reviews, pesticide application reviews, source identification and evaluation, documentation of initial outreach meetings, and recommendations for Management Plan monitoring. All other reporting for this element will be scheduled as proposed in the Overall Management Plan Approach (**Table 1** and **Figure 1**).

PATHOGEN INDICATORS

This element of the Management Plan addresses exceedances of *E. coli* bacteria which are used primarily as indicators of other human pathogenic organisms, including protozoans and viruses which can not be effectively monitored directly. Exceedances of pathogen indicators reflect a regional issue that affects the entire Central Valley. Consequently, this element of the management plan will be developed and implemented on a regional basis in coordination with the Central Valley Regional Water Board and other ILRP Coalitions.

REVIEW DATA AND REGULATORY BASIS FOR EXCEEDANCES

The need for developing management plans is determined by exceedances of “Water Quality trigger limits” established by the Regional Water Board ILRP. These trigger limits include adopted numeric Basin Plan water quality objectives, California Toxics Rule criteria, and unadopted numeric interpretations of Basin Plan narrative objectives. The first step in the implementation of this element of the management plan is a review of the data and the basis establishing the need for the management plan. The basis for these trigger limits will be reviewed and evaluated for regulatory and scientific validity. Generally, adopted numeric objectives and criteria will be determined valid without any substantial additional review. Trigger limits based on unadopted numeric interpretations will receive additional evaluation. For pathogen indicators, this will include a review of numeric Basin Plan water quality objectives or numeric interpretations of Basin Plan narrative objectives used to determine exceedances. The review will evaluate the regulatory and scientific basis for the objectives, the beneficial uses that these objectives are intended to protect and their applicability to the affected drainages, and allowable exceedance frequencies. Any substantial questions regarding validity or interpretation of the objectives used to determine exceedances will be summarized and provided to the Regional Water Board staff and the ILRP Technical Issues Committee for additional consideration and evaluation. Based on the results of these evaluations, the exceedances and need for a pathogen management plan may be reevaluated. However, development and implementation of management plans required by exceedances of the trigger limits will proceed according to the normal schedule while any additional considerations are completed.

Sites observed to have more than one exceedance of numeric Basin Plan water quality objectives or numeric interpretations of Basin Plan narrative objectives for pathogens are listed in **Appendix A**. Exceedances based on trigger limits requiring additional evaluation are identified in the site-specific management plans in **Appendix B**.

SOURCE IDENTIFICATION

The primary challenge in developing a management plan for pathogen indicators is determining the sources of the exceedances. Sources of the organisms used as pathogen indicators – *E. coli* in this case – include all warm blooded animals (humans, domestic pets and livestock, waterfowl and other birds, and other assorted wildlife of all kinds). Consequently, *E. coli* is everywhere in the environment and there are typically multiple potential sources for virtually every water body, which presents significant challenges in source identification. The Coalition has implemented and completed a preliminary source identification study that suggested that sources other than agriculture were primarily responsible for most exceedances of objectives for pathogen indicators. However, the results of these preliminary efforts were determined not to be

SVWQC Management Plan

adequately definitive for source identification, and the ILRP coalitions have initiated development of a new bacterial source identification study. Development of this study will be coordinated with the Central Valley Regional Water Board and will include peer review to ensure the scientific validity of the study strategy and methods. The specific objectives and time frame for conducting the study have not yet been established.

Additional independent Coalition efforts to support source identification for pathogens will include the following:

- The Coalition will survey Coalition members in the targeted drainages to inventory applications of animal wastes on agricultural fields.
- Acreage used for grazing operations will be catalogued in targeted drainages.
- A field survey (i.e. “creek walk”) will be considered for affected drainages. The primary purpose of these field surveys will be to identify and document potential non-agricultural and agricultural sources of pathogens and indicators, such as septic system discharges, wildlife activity, access by cattle, etc. The decision to conduct field surveys will be determined primarily based on completeness of access, cost of survey, and available resources to conduct the surveys.
- Source Evaluation Report: These independent Coalition source identification efforts are expected to be completed by June of the year following establishment of the management plan requirement. A focused Source Evaluation Report will be prepared documenting the following drainage-specific information for irrigated parcels in the affected drainages: manure applications, percent grazed acreage, irrigation practices, relevant management practices currently in place, and Coalition participants. Potential sources will be prioritized by reported applications of waste, drainage distance to water bodies, percent of agricultural acreage, and use of relevant management practices. This report will be completed by September of the 2nd year following the trigger of the specific management plan requirement (see **Table 1** and **Figure 1**), with the first report in September 2010. Schedules and goals for additional management plan elements (e.g., management practice implementation) will be developed and modified based on the results of the source evaluation.

MANAGEMENT PRACTICE IMPLEMENTATION

Implementation of specific additional appropriate management practices will initially depend on the results of the Coalition’s independent source evaluations (described above) and on the baseline management practices already in place. The longer term goals and scope of implementation will ultimately be dependent on the outcome of the bacterial source identification studies. To support these longer-term coordinated source identification efforts, the Coalition’s independent efforts to identify appropriate additional management practices will initially include:

- ❑ Discussions with landowners and/or growers of the exceedances, possible sources of pathogens, and management plan requirements and goals, and options for management practices. These discussions will be incorporated into scheduled public outreach meetings for the Subwatersheds or regions.

SVWQC Management Plan

- ❑ Detailed information for relevant cultural practices and management practices already in place will be developed through surveys of coalition members. Surveys are expected to be completed by June of the 2nd year following establishment of the management plan requirement, and will be conducted with the survey for animal waste applications for Source Identification. This information will be used with source evaluation results to determine whether implementation of additional management practices is appropriate and feasible, and to establish goals for additional management practice implementation. Identification of options for appropriate management practices may be coordinated with CURES, UCCE, County Agriculture Departments, NRCS, and RCDs, depending on the available resources. The specific coordinating entities are expected to vary in the different Coalition subwatersheds. The survey to inventory baseline management practices will be completed by June and reported in September of the year following trigger of the specific management plan.
- ❑ Additional targeted outreach may be conducted dependent on the results of source identification efforts and will provide options for additional appropriate management practices. Outreach will be prioritized and directed to likely agricultural sources of pathogen indicator organisms.

The results of outreach efforts will be documented and included in the Management Plan Progress Reports. These reports will also document any additional practices to be implemented, the goals and schedule for implementation, and measures of progress toward these goals. If it is determined that no additional appropriate management practices to control pathogen indicators are feasible, this will also be documented.

IMPLEMENTATION SCHEDULE

The schedule for development and implementation of additional management practices will be conducted as described in the overall Management Plan approach (**Figure 1**). The schedule will include quarterly progress meetings with the Regional Water Board ILRP staff. The schedule for site-specific and parameter-specific management plan elements is documented in **Appendix B**. The results of source identification efforts will be used to prioritize drainages or commodities by greatest potential for contributing to elevated pathogens and the lowest rates of management practice implementation. These priorities will be reflected in the schedule and scope of management plan implementation.

COMPLETION CRITERIA AND PERFORMANCE GOALS

The successful completion of the Management Plan will be determined by the Executive Officer of the Regional Water Board. The possible pathways for successful completion of this element of the management plan are described in the Overall Approach section.

The criteria for completion of each these pathways are summarized in Table 5 and the pathways are also illustrated in Figure 2. Because the relative contributions to pathogen indicator exceedances will generally not be able to be quantified, these criteria are generally qualitative, with the exception of compliance with water quality objectives. Consequently, determination that a specific criterion has been met will be based on a “weight of evidence” approach in consultation with Regional Water Board staff and approved by the Executive Officer of the Regional Board. Determination of compliance with water quality objectives for pathogens will

SVWQC Management Plan

be determined to occur when no more than one exceedance of the water quality objective or trigger limit has been observed in three years of the specified management plan monitoring.

Progress toward the implementation performance goals established for each subwatershed will be evaluated and documented in annual Management Plan Progress Reports. Specific performance goals will include the following:

- Completion of source identification and evaluation
- Completion and documentation of targeted outreach to Coalition members (and potential members, if appropriate)
- Return of waste application and management practice surveys from 100% of Coalition members in the target drainages (in June of 2nd year following trigger of management plan requirement).
- Documentation and reporting of baseline management practice inventory from surveys (in September of 2nd year following trigger of management plan requirement)
- Implementation of numbers or percentages of specific additional management practices in target drainages (goals and schedule established in Management Plan Progress Report).
- Specified decreases in frequency of exceedances (goals and schedule established in Management Plan Progress Report).

Table 5. Pathogen Management Plan Completion Criteria

Management Plan Pathway	Criteria for Successful Completion	Endpoint
1. Agriculture eliminated as source of exceedances	<ul style="list-style-type: none"> • E. coli bacteria confirmed not to have significant irrigated agricultural sources; 	Issue is referred to Regional Water Board staff for appropriate actions.
2. WQOs achieved by control of probable agricultural source(s) of exceedances	<ul style="list-style-type: none"> • Irrigated agricultural sources of E. coli bacteria confirmed; <u>AND</u> • Appropriate additional agricultural management practices have been identified, implemented, and documented; <u>AND</u> • Demonstrated achievement of water quality objectives 	Periodically reevaluate compliance per MRP monitoring schedule.
3. WQOs not achievable by control of probable agricultural source(s) of exceedances	<ul style="list-style-type: none"> • Irrigated agricultural sources of E. coli bacteria confirmed; <u>AND</u> • WQOs not achieved or expected to be achieved; <u>AND</u> • No additional appropriate management practices are possible or economically feasible; 	Infeasibility is documented and issue is referred to Regional Water Board staff for appropriate actions.
4. Probable sources not identified	<ul style="list-style-type: none"> • Probable specific toxicant(s) not identified; <u>AND</u> • All reasonable efforts at source ID exhausted 	Documented and referred to Regional Water Board staff for appropriate actions.

EVALUATION OF MANAGEMENT PLAN EFFECTIVENESS

Ultimately, the effectiveness of management plans will be judged on improvements in water quality and meeting water quality objectives. In the interim, the effectiveness of the management plan will be evaluated based on meeting the interim performance goals described above. Progress toward the implementation performance goals established for each subwatershed and management plan element will be evaluated and documented in annual Management Plan Progress Reports.

MONITORING

Monitoring to be performed as part of this element of the management plan will include two elements: (1) the Coalition's ongoing monitoring effort continues to routinely monitor for pathogen indicators; (2) Additional monitoring will be conducted as part of the bacterial source identification study currently under development. Continued monitoring for pathogen indicators in 2009 will be integrated with the monitoring strategy being developed by the Coalition in response to the renewed ILRP MRP. Future modifications to monitoring will also incorporate recommendations resulting from the coordinated source identification study. Any changes to approved monitoring schedules must be approved by Regional Water Board staff prior to implementation.

PARTICIPANTS RESPONSIBLE FOR IMPLEMENTATION

All Coalition subwatersheds will contribute to implementation of this Management Plan through their participation in the Coalition. Other ILRP coalitions and the Central Valley Regional Water Board are also expected to participate in the source identification study under development.

The participants responsible for implementing specific elements of the Management Plan are also provided in **Appendix B**.

REPORTING SCHEDULE

The coordinated bacterial source identification study currently under development is expected to be implemented in 2009. However, the results of this source identification study are not expected to be available until 2010. The results of initial Coalition source identification efforts and the inventory of baseline management practices will be reported in a technical memorandum by September of the 2nd year following trigger of management plan requirements, with the first report due in September 2010. The reports will include the results of data reviews, source identification and evaluations, documentation of initial outreach meetings, and recommendations for Management Plan monitoring. All other reporting for this element will be scheduled as proposed in the Overall Management Plan Approach (**Table 1** and **Figure 1**).

LEGACY ORGANOCHLORINE PESTICIDES

This element of the Management Plan addresses exceedances of numeric water quality objectives for legacy organochlorine pesticides. Sites observed to have more than one exceedance of numeric Basin Plan water quality objectives for legacy organochlorine pesticides in three years are listed in **Appendix A**. Implementation of this element of the management plan will be conducted on a drainage-specific basis for the drainages determined to require management of legacy organochlorine pesticides.

REVIEW DATA AND REGULATORY BASIS FOR EXCEEDANCES

Coalition monitoring data and the regulatory basis for determination of exceedances will be evaluated and summarized. Review of the monitoring data will focus on any seasonal patterns in exceedances that can be used to focus future monitoring efforts. Evaluation of the regulatory basis will focus on the beneficial uses that these objectives are intended to protect and their applicability to the affected drainages, and appropriate averaging periods and allowable exceedance frequencies. Any substantial questions regarding implementation of the objectives used to determine exceedances will be summarized and provided to the Regional Water Board staff and the ILRP Technical Issues Committee for additional consideration and evaluation. Based on the results of these evaluations, the exceedances and need for a management plan may be reevaluated. However, development and implementation of management plans required by exceedances of the objectives will proceed according to the normal schedule while any additional regulatory considerations are completed.

SOURCE IDENTIFICATION

Historical uses are considered the only significant sources of these legacy pesticides. Because no legitimate uses remain for agriculture or other sources, no formal source identification efforts will be undertaken to determine whether there are current sources of these pesticides. For the purpose of this management plan, it will be assumed that potential irrigated agricultural sources are limited to discharges of sediment and associated particulate-bound legacy pesticides from irrigated agricultural acreage. However, sources other than agricultural sediment discharges may contribute significantly to these exceedances. Efforts to identify potential sources will include:

- ☐ Survey of sediment concentrations of pesticides of concern: The affected water bodies will be sampled for sediments at locations selected to determine the spatial distribution of potential sources of legacy organochlorine pesticides to the water body. This sampling will be conducted during the irrigation season, in conjunction with the approved monitoring schedule. Recommendations for follow-up sampling to further characterize distributions will be based on the results of the initial survey of sediment concentrations. The results of this survey will be used to focus outreach efforts for implementation of management practices.
- ☐ Source Evaluation Report: A focused Source Evaluation Report will be prepared documenting the following drainage-specific information in the affected drainages: crops by percent of the total irrigated acreage, irrigation practices, soil erosion potential, erosion and sediment management practices currently in place, and the results of the sediment survey. Potential sources will be evaluated for their potential contributions to

SVWQC Management Plan

erosion and transport of legacy pesticides. The purposes of this evaluation are to document spatial distribution of pesticides in sediment, and to prioritize potential sources for outreach and management practice implementation.

MANAGEMENT PRACTICE IMPLEMENTATION

The process to identify appropriate additional management practices will include the following elements:

- ❑ Meetings with landowners and/or growers to discuss exceedances, possible sources and causes of sediment discharges, possible non-agricultural sources of legacy pesticides, options for relevant management practices, and management plan requirements and goals.
- ❑ If agriculture is determined to be a probable source, detailed information will be developed through surveys of Coalition members to document sediment and erosion management practices already in place to control erosion and sediment discharges in the affected drainages. With the results of the source evaluations, this information will be used to determine whether implementation of additional management practices is appropriate and feasible, and to establish goals for additional management practice implementation. (Although *control* of erosion is a goal of these management practices, it is not expected that soil movement from agricultural fields can be eliminated.) Identification of options for appropriate management practices may be coordinated with CURES, UCCE, County Agriculture Departments, NRCS, or RCDs, depending on the available resources. The specific coordinating entities are expected to vary in the different Coalition subwatersheds.

The results of outreach efforts will be documented and included in the Management Plan Progress Reports. These reports will also document any additional practices to be implemented, the goals and schedule for implementation, and measures of progress toward these goals. If it is determined that no additional appropriate management practices to control legacy pesticides are feasible, this will also be documented with the basis for the determination.

IMPLEMENTATION SCHEDULE

The schedule and responsibilities for implementation of additional management practices will be documented as described in the overall Management Plan approach.

COMPLETION CRITERIA AND PERFORMANCE GOALS

The successful completion of the Management Plan will be determined by the Executive Officer of the Regional Water Board. The possible pathways for successful completion of this element of the management plan are described in the Overall Approach section.

The criteria for completion of each these pathways are summarized in Table 6 and the pathways are also illustrated in **Figure 2**. Because the relative contributions to exceedances of legacy pesticides will generally not be able to be quantified, these criteria are generally qualitative, with the exception of compliance with water quality objectives. Consequently, determination that a specific criterion has been met will be based on a “weight of evidence” approach in consultation with Regional Water Board staff and approved by the Executive Officer of the Regional Board. Determination of compliance with water quality objectives for legacy pesticides will be

SVWQC Management Plan

determined to occur when no more than one exceedance of the appropriate trigger limit has been observed in three years of management plan monitoring.

Progress toward the implementation performance goals established for each subwatershed will be evaluated and documented in annual Management Plan Progress Reports. Specific performance goals will include the following:

- Completion of source identification and evaluation
- Completion and documentation of targeted outreach to Coalition members (and potential members, if appropriate)
- Return of erosion management practice surveys from 100% of Coalition members in the target drainages (in September of 2nd year following trigger of management plan requirement).
- Documentation and reporting of baseline management practice inventory from surveys
- Implementation of numbers or percentages of specific additional management practices in target drainages (goals and schedule to be established in Management Plan Progress Report).
- Specified decreases in frequency of exceedances (goals and schedule established in Management Plan Progress Report).

Table 6. Legacy Organochlorine Pesticide Management Plan Completion Criteria

Management Plan Pathway	Criteria for Successful Completion	Endpoint
1. Agriculture eliminated as source of exceedances	<ul style="list-style-type: none"> Irrigated agricultural confirmed not to be a significant source of sediment discharges or erosion in the drainage; 	Issue is referred to Regional Water Board staff for appropriate actions.
2. WQOs achieved by control of probable agricultural source(s) of exceedances	<ul style="list-style-type: none"> Irrigated agricultural confirmed to be a source of sediment discharges or erosion; <u>AND</u> Appropriate additional agricultural management practices have been identified, implemented, and documented; <u>AND</u> Demonstrated achievement of water quality objectives 	Periodically reevaluate compliance per MRP monitoring schedule.
3. WQOs not achievable by control of probable agricultural source(s) of exceedances	<ul style="list-style-type: none"> Irrigated agricultural sources of sediment discharges or erosion are likely; <u>AND</u> WQOs not achieved or expected to be achieved; <u>AND</u> No additional appropriate management practices are possible or economically feasible; 	Infeasibility is documented and issue is referred to Regional Water Board staff for appropriate actions.
4. Probable sources not identified	<ul style="list-style-type: none"> Sources of legacy pesticides not identified; <u>AND</u> All reasonable efforts at source ID exhausted 	Documented and referred to Regional Water Board staff for appropriate actions.

EVALUATION OF MANAGEMENT PLAN EFFECTIVENESS

Ultimately, the effectiveness of management plans will be judged on improvements in water quality and meeting water quality objectives. In the interim, the effectiveness of the management plan will be evaluated based on meeting the interim performance goals described above. Progress toward the implementation performance goals established for each subwatershed and management plan element will be evaluated and documented in annual Management Plan Progress Reports.

MONITORING

Monitoring to be performed as part of this element of the management plan is described for specific water bodies in **Appendix B**. Monitoring at identified management plan sites will include the sediment survey described previously. Subsequent to completion of approved MRPP monitoring, sites will continue to be monitored as needed to evaluate success of implemented management practices. Changes to the approved monitoring schedule must be approved by Regional Water Board staff prior to implementation.

PARTICIPANTS RESPONSIBLE FOR IMPLEMENTATION

The participants responsible for implementing specific elements of the Management Plan are identified in **Appendix B**.

REPORTING SCHEDULE

The results of initial source identification efforts will be reported in a technical memorandum by June of the 2nd year following trigger of management plan requirements, with the first report due in June 2010. The reports will include the results of data reviews, results of the focused source evaluations, documentation of initial outreach meetings, and recommendations for continued Management Plan monitoring. All other reporting for this element will be scheduled as proposed in the **Overall Management Plan Approach** and **Appendix B**.

TRACE METALS

This element of the Management Plan addresses exceedances of numeric water quality objectives for trace metals (arsenic, cadmium, copper, lead, nickel, selenium, and zinc). The trace metal boron is addressed in the salinity Management Plan section. Sites observed to have more than one exceedance of numeric Basin Plan water quality objectives for trace metals in three years are listed in **Appendix A**. Implementation of this element of the management plan will be conducted on a drainage-specific basis for the drainages determined to require management of trace metals exceedances.

REVIEW DATA AND REGULATORY BASIS FOR EXCEEDANCES

Coalition monitoring data and the regulatory basis for determination of exceedances will be evaluated and summarized. Review of the monitoring data will focus on any seasonal patterns in exceedances that can be used to focus future monitoring efforts. Evaluation of the regulatory basis will focus on the beneficial uses that these objectives or trigger limits are intended to protect and their applicability to the affected drainages, and appropriate averaging periods and allowable exceedance frequencies. Any substantial questions regarding implementation of the objectives used to determine exceedances will be summarized and provided to the Regional Water Board staff and the ILRP Technical Issues Committee for additional consideration and evaluation. Based on the results of these evaluations, the exceedances and need for a management plan may be reevaluated. However, development and implementation of management plans required by exceedances of the objectives will proceed according to the normal schedule while any additional regulatory considerations are completed.

SOURCE IDENTIFICATION

The major sources of trace metals in the Central Valley have already been categorically identified, and include urban runoff, surface water and groundwater sources, and natural geological sources, as well as some direct agricultural uses of specific metals (e.g., copper). Sources of metals in agricultural runoff may also include direct importation from surface or groundwater supplies, dissolution of naturally occurring metals in soils, and intentional addition of some trace metals as micronutrients or pesticides. The following source identification efforts will be conducted on a drainage-specific basis to identify potential sources of trace metals and to evaluate potential agricultural and non-agricultural contributions to exceedances:

- ☐ Review of agricultural uses: Agricultural uses of the specific metals of concern will be reviewed to determine whether they are used or likely to be used by irrigated agriculture in the affected drainages. If available, data will be compiled for applications of the specific metals in the affected drainages, and the data will be evaluated for use patterns and timing.
- ☐ Identification of agricultural and non-agricultural sources: Agricultural uses of the specific metals of concern will be reviewed to determine whether they are used or likely to be used by irrigated agriculture in the affected drainages. If available, data will be compiled for applications of the specific metals in the affected drainages, and the data will be evaluated for use patterns and timing. Non-agricultural sources of metals will also be identified and relative contributions will be evaluated based on available information

SVWQC Management Plan

on agricultural uses and non-agricultural sources (e.g., agricultural supply water or natural geological sources). The primary purpose of this evaluation is to determine whether irrigated agriculture is a direct source or contributor to exceedances of the metals of concern.

- ❑ Source Evaluation Report: A focused Source Evaluation Report will be prepared documenting the following information for the affected drainages: relevant information for non-agricultural sources, agricultural application information for the specific metals of concern, application and irrigation practices, relevant management practices currently in place, and Coalition participants in the drainage.

MANAGEMENT PRACTICE IMPLEMENTATION

Implementation of specific additional appropriate management practices will depend on the outcome of the metals source identification studies. To support these source identification efforts, the process to identify appropriate additional management practices will initially include:

- ❑ Meetings with landowners and/or growers to discuss the exceedances, possible sources of metals, management plan requirements and goals, and options for management practices. These discussions will be incorporated into scheduled public outreach meetings for the Subwatersheds.
- ❑ If source identification studies determine that irrigated agriculture sources contribute to exceedances of trace metals objectives, detailed information for relevant cultural practices and management practices already in place will be developed through surveys and other mechanisms. This information will be used to determine whether implementation of additional management practices is appropriate and feasible, and to establish goals for additional management practice implementation. Identification of options for appropriate management practices may be coordinated with CURES, UCCE, County Agriculture Departments, NRCS, RCDs, farm input suppliers, and pest control advisors, depending on the available resources and the specific trace metals of concern. The specific coordinating entities are expected to vary in the different Coalition subwatersheds.
- ❑ Additional targeted outreach may be conducted dependent on the results of source identification efforts and will provide options for additional appropriate management practices. Outreach will be prioritized and directed to likely agricultural sources of pathogen indicator organisms.

The results of outreach efforts will be documented and included in the Management Plan Progress Reports. These reports will also document any additional practices to be implemented, the goals and schedule for implementation, and measures of progress toward these goals. If it is determined that no additional appropriate management practices to control specific trace metals of concern are feasible, this will also be documented.

IMPLEMENTATION SCHEDULE

The schedule and responsibilities for implementation of additional management practices will be documented as described in the overall Management Plan approach.

COMPLETION CRITERIA AND PERFORMANCE GOALS

The successful completion of the Management Plan will be determined by the Executive Officer of the Regional Water Board. The possible pathways for successful completion of this element of the management plan are described in the Overall Approach section.

The criteria for completion of each these pathways are summarized in Table 7 and the pathways are also illustrated in **Figure 2**. These criteria are generally qualitative, with the exception of compliance with water quality objectives. Consequently, determination that a specific criterion has been met will be based on a “weight of evidence” approach in consultation with Regional Water Board staff and approved by the Executive Officer of the Regional Board. Determination of compliance with water quality objectives for metals will be determined to occur when no more than one exceedance of the appropriate trigger limit has been observed in three years of the specified management plan monitoring.

Progress toward the implementation performance goals established for each subwatershed will be evaluated and documented in annual Management Plan Progress Reports. Specific performance goals will include the following:

- Completion of source identification and evaluation
- Completion and documentation of targeted outreach to Coalition members (and potential members, if appropriate)
- Return of management practice surveys from 100% of Coalition members in the target drainages
- Documentation and reporting of baseline management practice inventory from surveys
- Implementation of numbers or percentages of specific additional management practices in target drainages (goals and schedule to be established in Management Plan Progress Report)
- Specified decreases in frequency of exceedances (goals and schedule established in Management Plan Progress Report).

Table 7. Trace Metals Management Plan Completion Criteria

Management Plan Pathway	Criteria for Successful Completion	Endpoint
1. Agriculture eliminated as source of exceedances	<ul style="list-style-type: none"> • Metal confirmed not to have significant irrigated agricultural sources; 	Issue is referred to Regional Water Board staff for appropriate actions.
2. WQOs achieved by control of probable agricultural source(s) of exceedances	<ul style="list-style-type: none"> • Irrigated agricultural sources likely; <u>AND</u> • Appropriate additional agricultural management practices have been identified, implemented, and documented; <u>AND</u> • Demonstrated achievement of water quality objectives 	Periodically reevaluate compliance per MRP monitoring schedule.
3. WQOs not achievable by control	<ul style="list-style-type: none"> • Irrigated agricultural sources likely; <u>AND</u> • WQOs not achieved or expected to be achieved; <u>AND</u> 	Infeasibility is documented and

SVWQC Management Plan

of probable agricultural source(s) of exceedances	<ul style="list-style-type: none">No additional appropriate management practices are possible or economically feasible;	issue is referred to Regional Water Board staff for appropriate actions.
4. Probable sources not identified	<ul style="list-style-type: none">Sources of specific metals not identified; <u>AND</u>All reasonable efforts at source ID exhausted	Documented and referred to Regional Water Board staff for appropriate actions.

EVALUATION OF MANAGEMENT PLAN EFFECTIVENESS

Ultimately, the effectiveness of management plans will be judged on improvements in water quality and meeting water quality objectives. In the interim, the effectiveness of the management plan will be evaluated based on meeting the interim performance goals described above. Progress toward the implementation performance goals established for each subwatershed and management plan element will be evaluated and documented in annual Management Plan Progress Reports.

MONITORING

Monitoring proposed to be performed as part of this element of the management plan is summarized in **Appendix B**. Some sites will continue to be monitored routinely as part of the Coalition's ongoing 2009 monitoring effort. Subsequent to completion of 2009 Coalition monitoring, sites will continue to be monitored for specific trace metals as needed to evaluate success of implemented management practices, or to conduct additional source identification. Continued monitoring of affected sites in 2009 will be integrated with the monitoring strategy being developed by the Coalition in response to renewed ILRP MRP. The specific scope and timing of any continued monitoring will be based on results of the source identification evaluations and monitoring results. Any changes to the approved monitoring schedule must be approved by Regional Water Board staff prior to implementation.

PARTICIPANTS RESPONSIBLE FOR IMPLEMENTATION

The participants responsible for implementing specific elements of the Management Plan are provided in **Appendix B**.

REPORTING SCHEDULE

The results of initial source identification efforts will be reported in a technical memorandum by September 2011. The reports will include the results of data reviews, water quality objective evaluations, documentation of initial outreach meetings, and recommendations for additional Management Plan monitoring. All other reporting for this element will be scheduled as proposed in the Overall Management Plan Approach.

SALINITY

This element of the Management Plan addresses exceedances of total dissolved solids (TDS), electrical conductivity (EC), and boron. Salinity is a regional issue that affects the entire Central Valley and Sacramento-San Joaquin Delta. Consequently, this element of the management plan will be developed and implemented on a regional basis in coordination with the Central Valley Regional Water Board and other ILRP Coalitions. The Central Valley Regional Water Board and State Regional Water Board have initiated a comprehensive effort to address salinity problems in California's Central Valley and to adopt long-term solutions that will lead to enhanced water quality and economic sustainability. Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) is an effort to develop and implement a comprehensive salinity management program. The CV-SALTS program is a multi-year effort anticipated to continue through 2012. In the context of the ILRP, the primary mechanism for developing and implementing a salinity management plan will be the Coalition's continued participation in this effort. Specific management plan actions to be implemented by the Coalition in support of these efforts are documented in the following sections.

REVIEW DATA AND REGULATORY BASIS FOR EXCEEDANCES

The first step in the implementation of this element of the management plan is a review of the monitoring data and the regulatory basis establishing the need for the management plan. For TDS and EC, this will include a review of numeric Basin Plan water quality objectives or numeric interpretations of Basin Plan narrative objectives used to determine exceedances. The review will evaluate the regulatory and scientific basis for the objectives, the beneficial uses that these objectives are intended to protect and their applicability in the affected drainages, averaging periods for assessing exceedances, and allowable exceedance frequencies. Any substantial questions regarding validity or interpretation of the objectives used to determine exceedances will be summarized and provided to the Regional Water Board staff, the ILRP Technical Issues Committee, and appropriate CV-SALTS committee for additional consideration and evaluation. Based on the results of these evaluations, the exceedances and need for a salinity management plan may be reevaluated. However, development and implementation of management plans required by exceedances of the objectives will proceed according to the normal schedule while any additional regulatory considerations are completed.

SOURCE IDENTIFICATION

The major sources of salinity in the Central Valley have already been categorically identified, and include urban and rural water users, industrial users, surface water and groundwater sources, and natural geological sources, as well as agricultural users. Agricultural categories of salinity sources include direct importation from surface or groundwater supplies, evapoconcentration of supply water, addition of salts by dissolution of naturally occurring salts in soils, and intentional addition of salts as fertilizers or soil conditioners. The Coalition will support additional source characterization for the CV-SALTS program through the ongoing ILRP monitoring effort. Additionally, data will be compiled to characterize salinity characteristics of irrigation supply waters, if these data have not already been compiled by the CV-SALTS program.

SVWQC Management Plan

In addition to participation in the CV-SALTS process, the Coalition will conduct additional independent efforts to support source identification for salinity management.

- The Coalition will work with County Agricultural Departments to identify areas and drainages with elevated salinity.
- The Coalition will work with County Agricultural Departments to compile information about potentially salt-sensitive crops grown in these drainages.
- Source Evaluation Report: Because the CV-SALTS process is expected to be a protracted effort, the Coalition independent source identification efforts will be completed over an extended period compared to higher priority management plans. These independent Coalition source identification efforts are tentatively schedule to be completed by December of the 2nd year following establishment of this management plan requirement (December 2010), and reported in June 2011. The scope of this report will be determined in coordination with ILRP staff and will depend in part on types of information determined to be useful for the CV-SALTS process.

MANAGEMENT PRACTICE IMPLEMENTATION

Integrated management and control of salinity in Central Valley waters is the objective of the CV-SALTS effort, and can only be achieved by coordinated efforts by all of the stakeholders. The scope of agriculture management practice implementation for salinity will be determined through the CV-SALTS process. To support the efforts of the CV-SALTS process to identify appropriate additional management practices, the Coalition will implement the following:

- ❑ Meetings with landowners and/or growers to discuss exceedances, agricultural and non-agricultural salinity sources, options for relevant salinity management practices, and management plan requirements and goals.
- ❑ Information will be developed through surveys to document salinity management practices already in place in the coalition subwatersheds. This information is intended to supports CV-SALTS efforts to determine whether implementation of additional management practices is appropriate and feasible, and to establish goals for additional management practice implementation. Identification of options for appropriate management practices will be coordinated primarily with CV-SALTS Technical Advisory Committee. Evaluation of appropriate management practices may also be coordinated with CURES, UCCE, County Agriculture Departments, NRCS, and RCDs, depending on their available resources in specific subwatersheds. The surveys of salinity management practices are tentatively schedule to be completed by September of the 3rd year following establishment of this management plan requirement (September 2011), and documented in the subsequent Source Evaluation Report in December 2011. As discussed above, the scope of this report will be determined in coordination with ILRP staff and will depend in part on types of information determined to be useful for the CV-SALTS process. Schedules and goals for additional management plan elements (e.g., management practice implementation) will be developed and modified based on the results of the source evaluations and evaluation of baseline management practices already in place.

SVWQC Management Plan

The results of the initial outreach efforts will be documented and included in the Management Plan Progress Reports. Documentation of outreach efforts will include the participants, identified options for salinity management practices, additional practices planned to be implemented, and a summary of the CV-SALTS process and progress toward developing goals and schedule for additional management practice implementation.

IMPLEMENTATION SCHEDULE

The schedule for implementation of additional salinity management efforts is dependent on and will initially be developed through coordination with CV-SALTS, which is a many-year effort. Specific schedules and goals for each subwatershed or for the Coalition as a whole will be based on outcomes of the CV-SALTS process. The parties responsible for tracking implementation of management practices cannot yet be identified, but will be documented later in the process. Implementation will be evaluated and documented in annual reports as required for the Management Plan.

COMPLETION CRITERIA AND PERFORMANCE GOALS

Completion criteria for this element of the management plan will be developed through the CV-SALTS process and can not yet be specified for the Coalition. In the interim, progress toward the implementation performance goals established for each subwatershed will be evaluated and documented in annual Management Plan Progress Reports. Specific performance goals will include the following:

- Completion of source identification and evaluation
- Completion and documentation of targeted outreach to Coalition members (and potential members, if appropriate)
- Return of management practice surveys from 100% of Coalition members in the target drainages (estimated completion in September 2011).
- Documentation and reporting of baseline management practice inventory from surveys (estimated completion in December 2011)
- Implementation of numbers or percentages of specific additional management practices in target drainages (goals and schedule to be established in future Management Plan Progress Reports).
- Specified decreases in frequency or magnitude of exceedances or average concentrations (goals and schedule established in Management Plan Progress Report).

EVALUATION OF MANAGEMENT PLAN EFFECTIVENESS

Ultimately, the effectiveness of management plans will be judged on improvements in water quality and meeting water quality objectives. In the interim, the effectiveness of the management plan will be evaluated based on meeting the interim performance goals described above. Progress toward the implementation performance goals established for each subwatershed and management plan element will be evaluated and documented in annual Management Plan Progress Reports.

MONITORING

Monitoring to be performed as part of this element of the management plan will include two elements: (1) the Coalition's ongoing monitoring effort will continue to routinely monitor EC, TDS, and boron; (2) Additional monitoring may be conducted for drainages that are determined not to have sufficient available data to characterize EC, TDS, and boron in irrigation supply waters to support source identification. The performance of this additional monitoring will depend on the outcome of the source identification and data compilation efforts coordinated with the CV-SALTS program.

PARTICIPANTS RESPONSIBLE FOR IMPLEMENTATION

The participants responsible for implementing specific elements of the Management Plan are provided in **Appendix B**. The Coalition's initial responsibility for implementing this element of the Management Plan is through participation and coordination with the CV-SALTS program. Coalition Subwatersheds will be responsible for conducting the initial outreach for the Management Plan. Parties responsible for specific additional elements of implementation will be determined as these elements are developed.

REPORTING SCHEDULE

The results of initial source identification efforts and management practice inventory are tentatively estimated to be reported in a technical memorandum by June 2011. The reports will include the results of data reviews, water quality objective evaluations, documentation of outreach meetings, and any recommendations for additional Management Plan monitoring. All other reporting for this element will be scheduled as proposed in the **Overall Management Plan Approach** and **Appendix B**.

DO and pH

This element of the management plan addresses exceedances of dissolved oxygen (DO) and pH.

REVIEW DATA AND REGULATORY BASIS FOR EXCEEDANCES

The first step in the implementation of this element of the management plan is a review of the monitoring data and the regulatory basis establishing the need for the management plan. For DO and pH, this will include an evaluation of the current designated beneficial uses of the waterbodies to determine whether the COLD or WARM designations should apply. The information used will include an evaluation of whether natural seasonal conditions (e.g., low flows, elevated temperatures, and low DO) support these designated uses in water bodies which would be completely dry in the absence of irrigation returns. An initial determination will be made in consultation with appropriate Regional Board staff of the ambient conditions (including flow, DO, temperature, resident species) required to define and support the designated WARM and COLD beneficial uses. This task will include an evaluation of the existing monitoring data for seasonal patterns of flow, temperature and DO in the monitored waterbodies.

Recommendations for additional monitoring will be developed if available information is determined to be insufficient to establish appropriate beneficial uses for Coalition monitoring sites.

The review will evaluate the regulatory and scientific basis for the objectives, beneficial uses that these objectives are intended to protect and their applicability to the affected drainages, and allowable exceedance frequencies. Any substantial questions regarding validity or interpretation of the objectives used to determine exceedances will be summarized and provided to the Regional Water Board staff and the ILRP Technical Issues Committee for additional consideration and evaluation. Based on the results of these evaluations, the exceedances and need for a management plan may be reevaluated.

SOURCE IDENTIFICATION

Dissolved oxygen (DO) concentrations are often low regionally during low flow and high water temperature conditions (i.e., there are significant natural seasonal causes). These same conditions can cause or contribute to high or low pH in ambient water. These parameters also exhibit significant natural diurnal variation with daily fluctuations controlled principally by algal photosynthesis and respiration, and the buffering capacity of the water. These processes are controlled by light and nutrient availability, concentrations of organic matter, and temperature. These factors combine to cause increasing DO and pH during daylight hours and decreasing DO and pH at night. Diurnal variations are typically greater in summer because there is more light and higher temperatures. Irrigation return flows may influence this variation primarily by increasing or decreasing in-stream temperatures, or by increasing available nutrients or organic matter. Therefore, low DO concentrations may be caused or exacerbated by algal growth and natural diurnal respiration and variation. Algal growth may be influenced by potentially elevated nutrient runoff from irrigated agriculture (fertilizer application, irrigated pasture, dairy facilities), or from irrigation supply water that contains high nutrient concentrations or phytoplankton from upstream sources. To evaluate potential contributions of elevated nutrients from agriculture to DO and pH exceedances, the Coalition will undertake the following:

SVWQC Management Plan

- Nutrient applications and agricultural uses will be evaluated to better identify potential nutrient sources and to characterize use patterns in monitored drainages. The purpose of this element is to describe the types of nutrients applied, estimate how much is applied per acre of a specific crop type, when nutrients are typically applied, and how applications are linked with irrigation patterns. Because data for actual fertilizer applications are not available, this characterization will be made based on current land use data and available information on cultural practices (e.g., grazed pasture, manure applications, and crop types and the typical nitrogen and phosphorus applications required to support these crops).
- Available relevant monitoring data will be evaluated for nutrients and organic carbon in monitored drainages to determine whether excess nutrients may indirectly contribute to low dissolved oxygen or pH extremes through promotion of excessive algal growth. The evaluation will be made based on average ambient nutrient concentrations, observations of excessive algae, and their relationship with the frequency, and patterns and timing of low DO or extreme pH conditions from Coalition monitoring data. Evaluations of this relationship will utilize formal statistical methods if the available data support this, or will consist of a qualitative assessment if the data do not support more rigorous statistical methods.
- A focused Source Evaluation Report will be prepared documenting the following drainage-specific information for irrigated parcels in the affected drainages: crops by percent of total irrigated acreage, relative use of the additional nutrients by crop or commodity, nutrient application and irrigation practices, relevant management practices currently in place, and Coalition participants in the drainage. Based on a lower priority for this management plan element, source evaluations are estimated to be completed by June of 2011 and reported by September 2011.

MANAGEMENT PRACTICE IMPLEMENTATION

Implementation of specific additional appropriate management practices will depend on the outcome of the source identification efforts. To support these source identification efforts, the process to identify appropriate additional management practices will include:

- ☐ Discussions with landowners and/or growers of the exceedances, sources of nutrients and organic carbon, management plan requirements and goals, and options for management practices. These discussions will be incorporated into scheduled public outreach meetings
- ☐ If source identification studies determine that elevated nutrients from irrigated agriculture contribute to exceedances of DO and pH objectives, detailed information for relevant cultural practices and management practices already in place will be developed through surveys of Coalition members. This information will be used with the results of source evaluations to determine whether implementation of additional management practices is appropriate and feasible, and to establish goals for additional management practice implementation. Identification of options for appropriate management practices will be coordinated with CURES, UCCE, County Agriculture Departments, and RCDs.
- ☐ Depending on the results of source evaluations and baseline management practice implementation, targeted outreach may be conducted to provide options for additional

SVWQC Management Plan

appropriate management practices. Outreach will be prioritized and directed to growers of crops with high nutrient use.

The results of the initial outreach efforts will be documented and included in the Management Plan Progress Reports. Documentation of outreach efforts will include the participants, relevant options for management practices, any additional practices planned to be implemented, and the goals and schedule for additional management practice implementation. If it is determined that no additional appropriate management practices to control DO and pH are feasible, this will also be documented.

IMPLEMENTATION SCHEDULE

The schedule for development and implementation of additional management practices will be conducted as described in the overall Management Plan approach (**Table 1** and **Figure 1**). However, due to the lower priority and longer period expected for resolution for this management plan element, the schedule will be extended by one year. The schedule will include quarterly progress meetings with the Regional Water Board ILRP staff. The schedule for site-specific and parameter-specific management plan elements is documented in **Appendix B**. The results of source identification efforts and management practice inventories will be used to prioritize drainages or commodities by greatest potential for contributing to DO and oxygen exceedances and the lowest rates of management practice implementation. These priorities will be reflected in the schedule and scope of management plan implementation.

COMPLETION CRITERIA AND PERFORMANCE GOALS

The successful completion of the Management Plan will be determined by the Executive Officer of the Regional Water Board. The possible pathways for successful completion of this element of the management plan are described in the Overall Approach section. The criteria for completion of each these pathways are summarized in Table 8 and the pathways are also illustrated in **Figure 2**. These criteria are generally qualitative, with the exception of compliance with water quality objectives. Consequently, determination that a specific criterion has been met will be based on a “weight of evidence” approach in consultation with Regional Water Board staff and approved by the Executive Officer of the Regional Board. Determination of compliance with water quality objectives for DO and pH will be determined to occur when no more than one exceedance of the appropriate trigger limit has been observed in three years of the specified management plan monitoring.

Progress toward the implementation performance goals established for each subwatershed will be evaluated and documented in annual Management Plan Progress Reports. Specific performance goals will include the following:

- Completion of source identification and evaluation
- Completion and documentation of targeted outreach to Coalition members (and potential members, if appropriate)
- Return of management practice surveys from 100% of Coalition members in the target drainages
- Documentation and reporting of baseline management practice inventory from surveys

SVWQC Management Plan

- Implementation of numbers or percentages of specific additional management practices in target drainages (goals and schedule to be established in Management Plan Progress Report).
- Specified decreases in frequency of exceedances (goals and schedule established in Management Plan Progress Report).

Table 8. DO and pH Management Plan Completion Criteria

Management Plan Pathway	Criteria for Successful Completion	Endpoint
1. Agriculture eliminated as source of exceedances	<ul style="list-style-type: none">• Exceedances determined not to have significant irrigated agricultural causes;	Issue is referred to Regional Water Board staff for appropriate actions.
2. WQOs achieved by control of probable agricultural contributions to exceedances	<ul style="list-style-type: none">• Irrigated agricultural contribution likely; <u>AND</u>• Appropriate additional agricultural management practices have been identified, implemented, and documented; <u>AND</u>• Demonstrated achievement of water quality objectives	Periodically reevaluate compliance per MRP monitoring schedule.
3. WQOs not achievable by control of probable agricultural contributions to exceedances	<ul style="list-style-type: none">• Irrigated agricultural contribution likely; <u>AND</u>• WQOs not achieved or expected to be achieved; <u>AND</u>• No additional appropriate management practices are possible or economically feasible;	Infeasibility is documented and issue is referred to Regional Water Board staff for appropriate actions.
4. Probable causes not identified	<ul style="list-style-type: none">• Causes of exceedances not identified; <u>AND</u>• All reasonable efforts at identification of causes exhausted	Documented and referred to Regional Water Board staff for appropriate actions.

EVALUATION OF MANAGEMENT PLAN EFFECTIVENESS

Ultimately, the effectiveness of management plans will be judged on improvements in water quality and meeting water quality objectives. In the interim, the effectiveness of the management plan will be evaluated based on meeting the interim performance goals described above. Progress toward the implementation performance goals established for each subwatershed and management plan element will be evaluated and documented in annual Management Plan Progress Reports.

MONITORING

Monitoring to be performed as part of this element of the management plan will include two elements: (1) the Coalition's ongoing monitoring effort will continue to routinely monitor for field parameters; (2) If indicated by the source identification efforts, additional monitoring of nutrients will be conducted in subsequent years. This monitoring will be integrated with the monitoring strategy developed by the Coalition in response to renewed ILRP MRP, and will also incorporate any other recommendations resulting from the source identification efforts. Any changes to approved monitoring schedules must be approved by Regional Water Board staff prior to implementation.

PARTICIPANTS RESPONSIBLE FOR IMPLEMENTATION

The participants responsible for implementing specific elements of the Management Plan are provided in **Appendix B**.

REPORTING SCHEDULE

The results of initial source identification efforts and management practice inventories will be reported in a technical memorandum by September 2011. The reports will include the results of reviews of data and regulatory basis for exceedances, evaluations of nutrient contributions, focused WER, documentation of initial outreach meetings, and recommendations for the Management Plan monitoring. All other reporting for this element will be scheduled as proposed in the **Overall Management Plan Approach** and **Appendix B**.

Appendix A:
List of Parameters Requiring Management Plan
Development and Implementation

Appendix B: Site-Specific Management Plan Implementation

Site-Specific monitoring and implementation schedules are provided as separate files for each subwatershed.

Appendix C:
Implementation Responsibilities and Schedule
